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An analysis of how institutional resources are used, as revealed in the expenditure budget ". . . essentially a study of the relations of input and output." Itemizes and discusses standard major categories of expenditure and outlay items, four basic techniques used in the analysis of institutional expenditures (after totals of each category have been determined accurately); three types of normative data and several requisites for accurate normative data. Discusses separately, and in considerable detail, analyses of expenditures for (1) administration and general purposes, (2) the library, (3) plant operation and maintenance, and (4) instruction.

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IX. Budgetary Analysis

. . . . . John Dale Russell

In this discussion we will concentrate on budgetary analysis; this is essentially a study of the relations of input and output. We will not discuss budgetary procedure, which is an important topic in itself, but rather the analysis of how institutional resources are used, as revealed in the expenditure budget.

By definition, a budget must be a "plan for institutional income and expenditure covering a definite fiscal period." Like any plan, a budget requires careful analysis in its preparation. It must cover both income and expenditure; it is always related to a specific time period, such as the fiscal year; and it should be complete and inclusive of all institutional operation.

Further, the budget is an expression, in dollars and cents, of institutional purposes and policies. It follows that any analysis of it must be based on an understanding of the purposes of the institution. Two features of budgetary analysis must always be kept in mind: (1) a budget analyst does not have authority to question the purposes of an institution; he does have responsibility for showing how these are reflected in the expenditure pattern; (2) the expenditure pattern, on analysis, may show different purposes, or a different emphasis on purposes, from those that are officially recognized, e.g., intercollegiate athletics, or research.

Expenditure analysis is a technique for obtaining, from raw financial data, information that will enable administrative officials to draw sound conclusions and make intelligent decisions regarding the operational status of an institution. It is useful: (1) at the time the budget for the coming year is being prepared; (2) during the course of the fiscal year, as revisions in the budget are requested; and (3) at the end of the budget year, as a check-up on results.

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[1]This lecture is a composite of (a) Dr. Russell's detailed lecture outlines, and (b) considerable material from the series of articles by Dr. Russell and Dr. James I. Doi on "Analysis of Institutional Expenditures." The latter is used by permission of College and University Business in which the articles appeared in 1955 and 1956.

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Basic to all sound budgetary analysis is use of a good system for classification of expenditures. We are fortunate in higher education to have a good, standard system prepared originally by the National Committee on Standard Reports in 1935, and revised in the 1952 publication of the American Council on Education, entitled College and University Business Administration, Volume I.

Many institutions (perhaps most of them) unfortunately do not follow the standard system of classification precisely; therefore, inter-institutional comparisons of financial data must be made very cautiously.

For meaningful analysis of institutional expenditures, it is extremely important that accounting records classify all expenditures accurately and strictly, and in general accord with the standard pattern. The standard pattern sets up seven or eight distinct kinds of expenditures and outlays. These will be enumerated in this discussion, with some attention to desirable budgetary policies for each.

The standard major categories of expenditure and outlay items are as follows:

A. Educational and general expenditures.

These expenditures support the basic purposes for which an institution exists--teaching students and advancing knowledge. A characteristic of these expenditures is that they can appropriately be related to the number of students enrolled.

A general budgetary policy should be to support expenditures for educational and general purposes to the extent possible from unrestricted funds, and to encourage the largest possible number and amount of restricted gifts for purposes in this category. Further discussion of sub-classification within educational and general expenditures will be presented after noting the other kinds of current fund expenditures.

B. Organized activities related to educational departments.

Examples are a university press, operation of an agency for the construction and sale of psychological tests, operation of farms for instruction and demonstration in agriculture, operation of a laboratory school, operation of a home-demonstration house for students in home economics, and intercollegiate athletics.

Organized activities have two important characteristics:

1. They are fairly closely related to some educational department or purpose;
2. They produce some income for their own support.

The volume of these activities and the amount of their expenditure usually cannot be related to the number of students enrolled in an institution.

A policy usually followed in financing these activities is to try to make them self-supporting, but to subsidize them from general institutional funds to whatever extent is needed to make their operations successful. Each individual activity has to be analyzed separately to discover possible economies.

C. Auxiliary activities.

These are activities maintained for service to students and faculty; examples are residence halls, faculty housing, dining rooms, bookstores, student unions, and so forth. The volume of these activities normally cannot be related meaningfully to the total student enrollment of the institution. The most important characteristic of these activities is that they produce a direct income for their own support.

A recommended policy for financing auxiliary activities is that, as a group, they should be completely self-supporting, producing sufficient income to cover all direct expenditures, plus the estimated amount to cover indirect costs for plant operation and maintenance and for institutional administration, plus the costs of debt service, if the institution has incurred indebtedness for the construction of such facilities.

Auxiliary activities normally should not be expected to produce any net income beyond the full cost of their operation. When auxiliary activities are not self-supporting, budgetary analysis must be further pursued to determine the cause.

D. Non-educational expenditures.

These are expenditures that do not relate to the on-going program of an institution as an educational enterprise. Examples are scholarship grants, payments to annuitants (out of current funds), interest on indebtedness, and expenditures for fund-raising.

A sound financial policy is to hold expenditures in this category as nearly as possible to income that is restricted for these purposes. It must be remembered that expenditures for these purposes subtract from the support of the educational and general budget, if made from unrestricted funds.

E. Sponsored research.

This is now a large-scale activity in many institutions; in some, it has a higher dollar volume of operation than all other aspects of an institution combined. Sponsorship is largely by the

Federal Government, and also to some extent by industrial concerns. Endowed foundations often make "grants" to support research projects that are similar to sponsored research.

A common policy on financing sponsored research is to expect it to be completely self-supporting, and to pay its full share of institutional overhead. During analysis of these funds, two points should be taken note of: (1) the wide difference of practice among Federal agencies as to what constitutes fair payment for indirect costs; and (2) the temptation to divert funds, received as reimbursement for indirect costs, to specific purposes connected with a department that operates a research program.

F. Agency funds.

The characteristic of agency funds is that the institution does not own the assets, but merely holds and manages them for others. Examples are student deposits, research grants administered through members of an institution's staff, withholding tax collected but not yet remitted.

Agency funds sometimes provide a source of working capital for general current-fund operations. Since agency funds are "in and out" items, they have no effect on the net balance between income and expenditure. It is appropriate to charge a modest service fee (say 5 per cent) to cover the expenses of administering an agency fund account.

It is in the analysis of educational and general expenditures that the most important economies in institutional operations can be discovered. Subsequent discussion, therefore, will be limited to this category of expenditures.

The basic classification within "education and general expenditure" is according to function. Recognized functions under "education and general" are: (1) instruction (2) library (3) extension services (4) departmental research (or non-sponsored research) (5) administration (minus amounts charged off to other categories) and (6) plant operation and maintenance (also, minus amounts charged off to other categories).

A basic policy should be to put the maximum amount of expenditures for education and general purposes into the directly productive functions of instruction and library, and the least possible amounts, consistent with good service, into the "overhead" functions of administration and plant operation and maintenance. Further, there is need to keep a balance among the expenditures in the various functions.

Classification on the basis of function needs to be carefully distinguished from classification on the basis of object. When classifying according to function, one is asking "What function does the expenditure serve?" When classifying on the basis of "object," one is asking "What kind of a thing does the expenditure buy?" The object basis of classification is not a very useful means of analyzing total expenditures for education and general purposes.

Within each major functional category, expenditures can be subdivided as may seem useful for purposes of analysis. Sometimes an object basis is useful as a subdivision within a broad functional category.

Now, it has been emphasized that all financial analyses must be based on accounting records maintained in accordance with a sound system of classification and that expenditures be strictly allocated to proper categories. But no matter how well conceived the categories into which expenditures are classified, and no matter how carefully and accurately the financial accounting is done in accordance therewith, raw data on number of dollars expended requires further analysis and interpretation to be most meaningful. In fact, entirely erroneous conclusions may be drawn from raw data on expenditures unless they are accompanied by an appropriate analysis. As an example, Table 1 shows the expenditures in a state institution of higher education for each of the educational and general functions for 1951-52 and the budgeted amounts for the same functions for 1955-56.

Table 1
Expenditures for 1951-52 for Each Educational and General Function in a State Institution of Higher Education and Those Budgeted for 1955-56

Function	Actual Expenditures	Budgeted for 1955-56
Administration and general.....	$ 377,606	$ 470,000
Instruction.....	1,591,077	1,995,332
Organized research.....	47,877	51,833
Extension.....	55,139	73,200
Libraries.....	153,087	173,235
Plant operation and maintenance.....	446,830	508,000
Total for educational and general purposes.....	$2,671,616	$3,271,600

Table 1 shows the stage of financial analysis at which the first two requisites have been cared for. Total gross expenditures have been classified, first into that major grouping known as "educational and general" and then into recognized subcategories according to function. It may be presumed also that the second requisite, careful and accurate accounting, has been met. What do data such as those presented in Table 1

mean to a person not familiar with the innerworkings of the college or university? What would a member of the state legislature or the secretary of the state taxpayers association or any interested citizen conclude from the study of the figures in Table 1.

Probably the first observation would be that the institution is spending $600,000 more in 1955-56 than it did four years previously, for educational and general purposes. Increases in expenditures by a government agency are nearly always a cause for alarm among taxpaying citizens. A second observation from Table 1 is that expenditures for administration have increased more than $92,000, or almost 25 per cent, in the four-year period. Such an increase in "unproductive overhead" must be viewed very critically. Similarly, the increase of more than $60,000 for operation and maintenance of the physical plant would lead to a question as to whether this service is being conducted as efficiently as it formerly was.

An elected public official or a tax conscious citizen might draw the conclusion from a hasty examination of Table 1 that the institution is spending a lot of money unnecessarily--is, in fact, throwing money away like a drunken sailor. He might readily conclude that the tendency toward increases in expenditures should be checked when the next request for an appropriation is considered by the legislature and that further increases in appropriations should be denied. While such conclusions might be drawn honestly from Table 1, they might be very erroneous and harmful to an institution. Some further analysis is clearly needed to improve the interpretation of the data of Table 1.

Four basic techniques are used in the analysis of institutional expenditures, after totals of each category have been determined accurately.

A. <u>The percentage distribution</u>.

Within the category of educational and general expenditures, we find, as a general rule, the following percentage distribution among the various functions to be used as a guide, although deviations from it can be justified:

Administration, 15 per cent or less
Plant operation and maintenance, 16 per cent or less
Library, 5 to 6 per cent
Instruction, 60 per cent
The remaining 3 or 4 per cent for extension and research, depending on institutional purposes.

The method of percentage distribution can also be applied to the various objects or other subdivisions of expenditure within each function. The percentage distribution needs to be interpreted cautiously, for it is effected markedly by a number of factors, such as: (1) the size of the institution (2) the relative

affluence of the institution's financing and (3) the emphasis placed in the institution on such matters as research, expensive plant facilities, etc.

B. The expenditure per unit of service.

The analysis of expenditure per unit of service involves three steps: (1) selection of expenditure category to be analyzed; (2) selection of appropriate and measurable unit of service; (this may oftentimes be the student) and (3) relation of expenditure to the measure of service.

This is sometimes known as the "unit cost" technique. The term "unit cost" has unfortunately come to have a bad connotation in higher education, and probably should be avoided. Further, one should avoid using the term "per capita cost" for this does not have the same meaning.

Perhaps the most valid criticism of the "unit cost" technique arises from the difficulty of identifying an appropriate unit of production or service. The unit most commonly used is the student in attendance for a year, or some recognized fraction of a year's service, such as the credit hour. Some services maintained by institutions, however, are not related directly to the number of students in attendance.

There are many legitimate uses of data on expenditure per unit of service, particularly in budgetary analyses in institutions of higher education. Costs are both an index of quality and an index of efficiency, and care must be taken in interpreting an observed cost to note which factor is positive.

Let's take a moment to discuss these two methods of analysis before we go on to the others.

As an illustration of how the use of these two methods throws additional interpretative light on the statistics of dollars expended, Table 2 is presented showing the expenditure data of Table 1 expressed as percentages of totals and as amounts per student.

The very simple analysis presented in Table 2 changes completely the interpretation that might have been drawn from Table 1. Table 2 shows that during the four-year period the changes in distribution of expenditures among the various functions have been slight. The biggest change in percentages has been in the direction of getting a larger proportion of total expenditures into the directly productive function of instruction. The institution is spending fewer dollars per student on almost every function in its 1955-56 budget than it did in 1951-52. The total educational and general expenditures, which seemed in Table 1 to have increased so greatly,

are shown by Table 2 actually not to have kept pace with the increase in the number of students served. If the institution was financed on a reasonable basis in 1951-52, the conclusion from Table 2 must be that it needs more money, not less, than it has budgeted for 1955-56.

Table 2
Percentage of Total Educational and General Expenditures for Each Function, and Amount per Full-Time-Equivalent Student, in a State Institution of Higher Education for 1951-52, and Budgeted for 1955-56

Function	Percentage of Total Educational and General Expenditures		Amount per Full-Time-Equivalent Student	
	1951-52 Actual	1955-56 Budgeted	1951-52 Actual	1955-56 Budgeted
Administration and general	14.1	14.4	$117	$114
Instruction	59.6	61.0	494	485
Organized research	1.8	1.6	15	13
Extension	2.1	2.2	17	18
Libraries	5.7	5.3	47	42
Plant operation and maintenance	16.7	15.5	139	123
Total educational and general	100.0	100.0	$829	$795

Interpretation from the data on Table 2, however, is far from the final analysis. One immediately wants to ask what the experience of this institution has been in other years, or what the percentage distribution and amount per student are for other institutions in comparable years. To answer such questions requires information that is known as "normative data." A discussion of normative data will follow further discussion of other analysis techniques.

C. Program budget analysis.

This method proceeds from a conception of institutional activities as being classifiable into a number of separable "programs"; an attempt is made to determine the expenditure for each. Example of "programs" for which expenditure data might be sought are: (1) general education required of all students in the first two years; (2) the offering of a Bachelor's degree in French; (3) the offering of a Master's degree in English; (4) the student health service; (5) the counseling of students; (6) sabbatical leaves for faculty members; (7) unsponsored research; (8) correspondence study; (9) fund-raising activities.

Programs expenditure data may be usefully related to measures of service rendered. Program data are especially useful in forecasting effects of new developments on the budget.

D. Percentage of increase or decrease from some previous period.

This technique is useful only within a given institution, as a rule. The technique often has the great disadvantage of assuming that the base period is an ideal situation, or rather, failing to relate the base period to an ideal situation.

In general, this technique must be used very cautiously, for it is subject to manipulation by an unscrupulous investigator, who may be more interested in supporting a preconceived point of view than in finding the truth.

As mentioned above, normative data are needed for an adequate interpretation of any analysis made of institutional expenditures. In general, there are three types of normative data: (1) norms arbitrarily set up by some "authority." (An example is the suggested percentage distribution of expenditures among functions, as cited, above, under the discussion of the percentage distribution method of analysis;) (2) norms based on a time series within one institution, showing data from previous years; and (3) norms based on data from a sufficient number of similar institutions. (An example is the set of norms for expenditure per student, set up by the North Central Association.)

There are several requisites for accurate normative data:

(1) Data by expenditure classification under each of the major functional categories of educational and general expenditures should include such detail as is likely to be useful for administrative purposes.

(2) The collection of accurate and uniform data should be followed. Perhaps the greatest drawback that a college faces when it attempts to compare its financial data with those of other institutions is the lack of assurance that the information is truly comparable.

(3) Data should be recent. Few of the available compilations meet this criterion. Further, some sorts of data age more rapidly than others. In a period when the value of the dollar is changing, normative data may become obsolete quickly. While older data are valuable for historical purposes, most administrative decisions depend heavily on recent data. Norms should be renewed annually and should be released at a time when most useful for institutional administrative purposes.

(4) Institutions selected for inclusion in a group for which normative data are to be established should be comparable in as many respects as possible. Previous experience with attempts to compare expenditure data among institutions indicates that such factors as size of enrollments, location, general quality of instructional services, adequacy of support, and local institutional policies account for many of the differences.

Of course, there is a practical limit to the extent to which comparability of units comprising the normative group can be obtained. Every college is, in a real sense, unique--the only one of its kind. For highly complex social institutions, such as colleges and universities, it probably would be impractical to select more than three or four points of comparability in any exploratory project to derive normative data. The characteristics of each institution included in any population group should be kept in mind as possible explanations for deviations from the average in expenditure pattern or unit costs.

(5) Normative data should be based on a large enough group of institutions. If possible, the data should cover a period of consecutive years. What is a large enough number? The test is whether or not the addition of more institutions will change the norms. If a sample is well selected to represent an entire group or class, a surprisingly small number of individual institutions may yield a very stable norm.

The time span covered by normative data may properly differ in local circumstances. In general, a time series need not cover more than the last four or five years, unless some historical study is to be made. Carrying data for a longer time series is likely to clutter up tabular presentation and to complicate rather than to facilitate interpretation of the data for the most recent year. If it is desired to show the effect of a shift in policies, a time series should cover the period since that shift and a year or two prior to it. For most purposes the years during which policies have been stable will provide the most useful time series for normative purposes.

(6) Statistical data that are used as norms should have a) some expressions of the central tendency, such as the average or the median, and b) some measure of the extent of deviation from this central tendency by individual institutions.

Normative data of the North Central Association have been particularly useful because they have been set up in percentile form. This allows an institution at once to compare its own status with the central tendency (median) of the accredited group and also to interpret its deviation from the central tendency in terms of how far down or up it stands in the rank order list of these institutions. Thus, a college can tell that on a particular

item it rates in the lowest 10 per cent of accredited institutions, or that on another item only 20 per cent of the accredited institutions have a higher standing. This sort of information is much more useful than merely to know that the college is below average or above average, even when the amount of the deviation from the average is known.

At present we do not have good sources of normative data on expenditures for higher education in the United States. Some of the available sources which are useful from time to time are: (1) the United States Office of Education; (2) certain accrediting associations, such as the North Central Association; (3) some of the central church boards of education; (4) a few states that have centralized supervisory boards over their institutions of higher education; and (5) publications of the National Federation of College and University Business Officers Associations.

ANALYSIS OF EXPENDITURES FOR ADMINISTRATIVE AND GENERAL PURPOSES

Administration and general expense is one of six principal subcategories under educational and general expenditures recommended in the 1935 report of the National Committee on Standard Reports for Institutions of Higher Education. Included under administration and general expense are the costs of all offices, units and activities that serve the entire institution; excluded are expenditures for the library and plant operation and maintenance.

Somewhat more specifically the broad function of administration and general expenses, as used in the accounting systems of the New Mexico state educational institutions, includes three major categories: (1) administration, (2) student welfare, and (3) general expenditures.

Included in the first category of "administration" are such subitems as the expenses of the board of regents, the president's office, the business office, the registrar's office, the information and public relations office, legal expense, auditing, administrative publications, administrative travel, and the retirement payments for administrative staff members.

Under "student welfare" are such functions and services as the dean of students office (or the dean of men and dean of women), counseling and testing service, student health service, placement service, and alumni office.

"General expenditures" consist of a number of items that cannot readily be allocated to other functions, such as dues and membership

fees, commencement and diplomas, post office, telephone service, mimeographing and mailing, receptions and entertainment, and group life insurance. This last item, group insurance, might perhaps better have been distributed to the various functional areas in which the staff members serve, i.e. the amount on behalf of faculty members should be charged to instruction, that for members of the buildings and grounds staff should be charged to plant operation and maintenance, and that for administrative staff members to administration. Such a policy is followed in the accounting for retirement fund payments but has not been followed for group life insurance because the item is relatively small and the increased accuracy of accounting might not be worth the labor of distributing the amount involved to the various accounts.

The expenditures here analyzed for administration and general purposes should be the net amounts used for educational and general programs. In the case of each institution an appropriate amount for administrative overhead should be allocated to auxiliary enterprises and to organized activities related to instructional departments, and such allocations are subtracted from the gross expenditures for administration and general purposes.

The amounts of the allocations are determined individually by each institution on whatever basis seems appropriate. Similarly in those institutions which have contract-research programs and in which payments are received under the contracts for indirect administrative costs, the amount of such receipts is subtracted from the gross institutional expenditures for administrative and general purposes.

The primary purposes of every institution of higher education are instruction and research. Administrators and administrative services exist to aid the faculty, those who do the actual research and teaching, to carry out their functions. This policy should be clearly reflected in the financial operations of an educational institution. A simple method of showing the relationship between instruction and administration is to compute the percentage distribution of total educational and general expenditures for each function. These figures are most useful when computed for a time series of several years. Table 1 shows what such data look like for a state institution of higher education for each year from 1951-52 to 1955-56.

For the current fiscal year, 1955-56, the institution shown in Table 3 has budgeted for instruction 61 cents of every dollar designated for educational and general purposes, and for administration and general purposes less than 15 cents out of every dollar. The data for previous fiscal years show that this relationship is not unusual; this institution has consistently maintained approximately a 4 to 1 ratio between expenditures for instruction and those for administration and general purposes. This kind of budgetary information is very reassuring to legislators, who sometimes entertain the suspicion that an increasingly large proportion of state appropriations is expended for high salaried administrative officers and similar "unproductive overhead." Legislators

Table 3
Expenditures for Educational and General Purposes in a State Institution of Higher Education for Each Year From 1951-52 to 1955-56, Analyzed in Terms of Percentage and Amount per Full-Time Equivalent Student for Each Function

	Expenditures for Educational and General Purposes						
Fiscal Year	Administration and General	Instruction	Organized Research	Extension	Library	Plant Operation and Maintenance	Totals
Amount*:							
1951-52	$377,606	$1,591,077	$47,877	$55,139	$153,087	$446,830	$2,671,616
1952-53	378,905	1,557,117	37,937	57,139	147,373	414,051	2,592,522
1953-54	409,216	1,668,441	45,255	56,426	149,901	401,365	2,730,604
1954-55	410,000	1,716,000	46,500	68,000	153,500	420,000	2,814,000
1955-56	470,000	1,995,332	51,833	73,200	173,235	508,000	3,271,600
Percentage:							
1951-52	14.1	59.6	1.8	2.1	5.7	16.7	100.0
1952-53	14.6	60.1	1.4	2.2	5.7	16.0	100.0
1953-54	15.0	61.1	1.7	2.0	5.5	14.7	100.0
1954-55	14.6	61.0	1.6	2.4	5.5	14.9	100.0
1955-56	14.4	61.0	1.6	2.2	5.3	15.5	100.0
Average:	14.5	60.6	1.6	2.2	5.5	15.6	100.0
Amount per student:							
1951-52	$ 117.16	$ 493.66	$ 14.86	$ 17.11	$ 47.50	$ 138.64	$ 828.93
1952-53	119.15	489.66	11.93	17.97	46.35	130.20	815.26
1953-54	124.42	507.28	13.76	17.15	45.58	122.03	830.22
1954-55	110.01	460.42	12.48	18.25	41.18	112.69	755.03
1955-56	114.22	484.89	12.60	17.79	42.10	123.45	795.05
Average:	116.99	487.18	13.13	17.66	44.54	125.40	804.90

*Amounts for first three years are actual audited figures. Amounts for 1954-55 are estimates reported approximately two months before the close of the fiscal year. Amounts for 1955-56 are the budgeted expenditures.

and supporters of an institution also are interested in knowing what the relationship is between expenditure for a given function and the number of students served. Is the expenditure per student for administration rising? If so, how much? Such a question can best be answered by an analysis of expenditures for educational and general purposes showing amounts per full-time equivalent student for each function as presented in Table 3.

Table 3 shows that the amount per student budgeted for 1955-56 for administration and general, and for virtually every other function, is lower than the comparable expenditure for any other fiscal year of the five-year period, except 1954-55. The officials of the institution should have no difficulty explaining the drop in expenditures per student for 1954-55. In that year there was an unexpected increase of 13.3 per cent in enrollment. The appropriation already had been fixed by the legislature, so the institution had to make the best of the situation with the funds it had available for that year. The problem was presented to the next state legislature, and it provided a 22 per cent increase in appropriation for this institution. The effect of this increased appropriation on institutional operations is reflected in the amount per student budgeted for 1955-56 for educational and general purposes, as shown in Table 3.

The experience in New Mexico has been that members of legislative finance committees generally have a keen appreciation for compactly presented data on expenditures and costs. They may listen with apparent sympathy to a president's oration about the needs of his institution, in which he emphasizes the difficulties of employing and retaining competent faculty members and the pressure of increasing enrollments. But they seem to show a decided preference for unit cost figures, such as expenditure per student for educational and general purposes. When properly computed and interpreted, such data can sum up a good many arguments in a neat little package.

Institutional officials should support their petitions for more appropriations with such information. Otherwise they are likely to find themselves confronted by a request to comment on some analytical data claimed by a legislator to have been computed by him from the financial records of the institution or by some budget analyst who is not particularly well versed regarding college and university finance.

The institutional official in such a situation faces a double jeopardy. In the first place, it is always embarrassing to have to explain figures with which one is unfamiliar. In the second place, such data often will have been amateurishly calculated or otherwise do not properly reflect the educational program of the institution. An incorrect interpretation, once it is publicized, is difficult to correct. And if the effort is made to correct it, the legislator may be antagonized by what seems to him an attempt to discredit his figures.

The presentation of budget analysis data for one college or university generally invites comparison with similar information for other institutions. Is it unusual that only 15 cents out of every dollar designated for educational purposes is budgeted for administration and general expense? Are other institutions able to do on fewer dollars per student, or do they usually spend more? To provide answers to such questions on a truly comparable basis is one of the hazards of dealing with budget analysis data.

Worse still is the necessity of explaining why some other institution can operate with lower unit costs or can budget a greater proportion of its educational and general expenditures for instruction and less for administration. Low unit cost figures may indicate either great efficiency or poor quality of service; conversely, high cost figures may reflect either comparative inefficiency or an excellent quality of service. And again differences in expenditure pattern or cost per student might be due to factors, such as difference in accounting practice, totally unrelated to the question of efficiency or quality.

There is only one satisfactory solution to this problem. Normative data of the kind that will enable one institution to compare its expenditures with those of another must be collected and be made available.

In order to answer questions calling for comparison of expenditure data among institutions, the New Mexico Board of Educational Finance, since it began operations in 1952, has made an annual analysis of the budgets of the New Mexico state colleges and universities. Table 4 shows the percentage distribution of educational and general expenditures for each function and the amount per student expended by each of the six New Mexico state institutions of higher education for 1954-55, the last completed fiscal year.

It will be noted from Table 4 that the percentage distribution for the total of the six institutions for 1954-55 differs little from the average for the five-year period. One of the interesting observations from this attempt to collect and present normative data is the stability of the percentage distribution of expenditures among the various functions. The figures change little from year to year, either for the individual institutions or for their combined average.

Although the percentage distribution for an institution is very stable from one year to the next, Table 4 shows that, among the institutions, the percentages of total educational and general expenditures devoted for administration and general expense vary considerably. It is clear from the table that at least two of the institutions have some explaining to do if they are to justify the relatively high proportion of their total expenditures used for administration and general purposes.

Previous studies dealing with data for institutions of higher education have established that any one of the following factors may

Table 4
Percentage Distribution of Total Educational and General Expenditures for Each Function for Each of Six State Institutions of Higher Education for 1954-55, and Average for All Six Institutions Combined for Five-Year Period, Including Budget for 1955-56

Institution	Full-Time Equivalent Enrollment	Administration & General	Instruction	Organized Research	Extension	Libraries	Plant Operation and Maintenance
"A"	3,727	14.6	61.0	1.6	2.4	5.5	14.9
"B"	1,702	14.6	61.8	0.2	0.0	5.3	18.1
"C"	925	14.0	60.1	---	0.3	4.9	20.7
"D"	464	21.8	50.4	---	3.0	5.1	19.7
"E"	967	22.2	54.4	---	2.7	5.7	15.0
"F"	174	15.9	48.4	---	---	4.3	31.4
Weighted average for 1954-55		15.9	59.0	0.8	1.7	5.3	17.3
Five-year average for all institutions combined		15.7	58.9	0.8	1.6	5.3	17.7

result in variation in figures showing percentage of total spent for administration and general: (1) differences in accounting practice; (2) degree of adequacy of support; (3) size of enrollments, and (4) differences in institutional policies with respect to salaries and elaborateness of the administrative staff.

For the six New Mexico institutions the first two factors can be ruled out as having no significant effect on the percentage of total educational expenditures spent for administrative and general purposes. With respect to both classification and handling of expenditure data and adequacy of support, this group of institutions has about as high a degree of comparability and similarity as could be found.

Size makes a Difference

Examination of the enrollment data strongly suggests that size of the institution could account for some of the difference in the percentage figures showing proportion of total educational expenditures spent for administration and general. The larger institutions tend to assign a smaller part of their total educational expenditures for this function. There are, however, two notable exceptions.

Institution "E," which ranks third in enrollment, devotes the largest proportion of its educational expenditures to administration and general functions. Examination of the administrative organization of this college shows that it is top-heavy and over-elaborate. The same organization could adequately serve an institution with at least 50 per cent more students. Institution "F," the smallest from the standpoint of enrollment, spent only 15.9 per cent of its total educational and general expenditures for administration and general purposes. This insitution, in addition to its instructional program, maintains an extensive contract-research program. A large proportion of its total administration and general expense is charged off as overhead to the contract-research program.

Table 5 shows the amount expended per student for each of the functions under educational and general expenditures. The table shows the amounts for each of the six institutions for the last completed fiscal year, 1954-55, and also the combined average for all six institutions for a five-year period, beginning with 1951-52 and running through the budgeted amounts for 1955-56.

As previously explained, 1954-55 was a low year for expenditure per student because of the general increase that occurred in enrollments that year without there being any corresponding increase in budgetary support. The five-year average is thus substantially above the amounts for 1954-55 for each of the functions. There also has been some effort put into increased efficiency so that the institutions are serving more students without correspondingly increased appropriations.

Table 5

Expenditure per Student for Each Educational and General Function for Six State Institutions of Higher Education for 1954-55, and Average for All Institutions Combined for Five-Year Period, Including Budget for 1955-56

Institution	Full-Time Equivalent Enrollment	Administration & General	Instruction	Organized Research	Extension	Libraries	Plant Operation & Maintenance	Total Expenditure per Student
"A"	3,727	$110.01	$460.42	$12.48	$18.25	$41.18	$112.69	$755.03
"B"	1,702	100.70	428.19	1.06	0.18	36.80	125.48	692.41
"C"	925	97.60	417.47	---	2.42	33.73	143.78	695.00
"D"	464	195.00	450.04	---	26.79	45.56	175.63	893.02
"E"	967	136.28	334.28	---	16.55	35.16	92.00	614.27
"F"	174	268.53	814.66	---	---	71.53	529.17	1,683.89
Weighted average for 1954-55		$118.18	$440.35	$ 6.07	$12.44	$39.57	$129.30	$745.91
Five-year average for all institutions combined		$128.23	$481.80	$ 6.79	$12.91	$43.28	$144.99	$818.00

Table 5 shows that the amounts per student expended for administration and general purposes, like the percentage figures, vary rather widely.

The variations shown in Table 5 call for some explanation and justification. The figures for institution "E" in particular sugge : that it could well afford to reduce its administrative expenditure and devote more of its funds to the instructional program.

The data show that the larger institutions tend to spend less per student for the administration and general function than the smaller ones spend. Both the figures for percentage of total educational expenditures used for administration and general and the amount per student expended for this function point to what has been known to students of higher education for some time, namely, that institutions with enrollments of approximately a thousand or less are in many respects inherently less efficient than institutions with larger enrollments. Certain administrative functions, such as meetings of the governing board and the office of the president, have to be performed regardless of the size of the institution, and their expenditures do not correspond in scope to the number of students enrolled.

The experience in New Mexico has been that, once this fact is explained to legislators and to state finance officers, they no longer get greatly excited over variations in data showing expenditures per student for educational and general purposes. They tend, rather, to show greater interest in promoting enrollment increases in the smaller institutions, hoping that registrations may reach a point where more economical operation can be expected. When the analysis indicates that factors other than enrollment, such as top-heavy administration, are the probable causes of high unit costs, officials of the institutions need to be urged to take steps to correct the situation as quickly as possible.

New Mexico institutions, by agreement among the business managers, classify their administration and general expense into three subdivisions: "administration," "student welfare services," and "general expense." With but minor exceptions the items included in each of the subdivisions are identical with those suggested for "general administration," "student welfare," and "general institutional expense" in the 1952 committee report.

Table 6 shows the percentages of total educational and general expenditures for "administration," for "student welfare," and for "general expense," and the amounts per student for each function for 1954-55 at each of six New Mexico institutions. These data point up certain interesting variations among institutions that the percentage figures on distribution of expenditures for educational and general purposes did not bring out.

Before any conclusions are reached about adequacy and relative efficiency of student welfare services among these three institutions,

Table 6
Percentage of Total Educational and General Expenditures for Administration, Student Welfare, and General Expense, and Amount per Student for Each Subdivision for 1954-55 for Six State Institutions of Higher Education.

Institution	ADMINISTRATION		STUDENT WELFARE		GENERAL EXPENSE	
	Percentage	Amount per Student	Percentage	Amount per Student	Percentage	Amount per Student
"A"	6.7	$ 50.77	5.2	$39.29	2.7	$19.95
"B"	10.4	72.00	2.7	18.34	1.5	10.36
"C"	10.2	71.21	1.6	10.87	2.2	15.52
"D"	12.2	109.02	5.8	51.57	3.8	34.41
"E"	12.6	77.25	7.2	44.27	2.4	14.76
"F"	11.5	193.34	2.2	36.91	2.2	38.28
Weighted Average	9.1	$ 67.41	4.4	$32.77	2.4	$18.00

further examination of their budgets should be made. Institutions "B" and "C," it was found, classify their student health services as an auxiliary enterprise and did not include them in their reports on expenditures for student welfare services. This is an inconsistency that should be corrected. The other four institutions, including "A," classified their student health services as a part of their student welfare program. This difference in accounting practice explains in large part the unusually low expenditure per student for student welfare services at institutions "B" and "C."

The data shown in Table 6 suggest that at institution "E," which earlier had been referred to as an institution with an overly elaborate administrative organization, the areas that are out of line are its administrative offices and its student welfare services. Its "general expense" is at a reasonable level.

The items included under each subdivision of administration and general expense are subject to much more detailed kinds of analyses. The data produced from such analyses can be of great value to institutional officials. For the New Mexico institutions the Board of Educational Finance regularly provides comparative data on salaries for individual administrative positions. Data also are provided on expenditures for a number of administrative and general services, such as public relations and information, administrative publications, auditing and so forth.

There has been virtually no research reported on the standards for the number of secretaries and clerical workers a college or a university should employ. In four New Mexico institutions, the ratios of number of students to each person on the clerical staff have a high degree of similarity.

The New Mexico data suggest that reliable norms might be developed on student-clerical employee ratios for institutions of different sizes. Such information would greatly assist administrative officials of higher educational institutions in detecting inefficiencies in an area to which a large proportion of total expenditures for administrative and general functions is committed. On the average, the six New Mexico institutions during 1954-55 devoted to salaries of secretarial and clerical personnel employed in the administrative offices more than 5 per cent of their total expenditures for educational and general purposes.

The average salaries paid the clerical worker in the administrative offices are greatly influenced by the supply and demand for such talent in the area in which an institution is located. Institutions located in the vicinity of federal installations, such as air force bases and weapons research centers, find themselves having to compete with federal government wage scales in order to retain their clerical personnel. The average clerical salaries at these institutions are several hundred dollars higher than similar averages for institutions located in

agricultural, non-industrial areas. The geographical location of an institution of higher education is therefore a factor to be considered in explaining variations in expenditure data for administrative and general purposes.

ANALYSIS OF LIBRARY EXPENDITURES

The college librarian, on most campuses, is a well trained, devoted practitioner of what he, his colleagues, and the academic world generally think of as a profession. The librarian typically will have had more professional preparation for this position than any other member of the college or university administrative staff. Not only does his training give him a firm grasp of the technical processes of library operations, such as maintaining accession lists, purchasing books, classifying and cataloging documents, answering reference questions, and overseeing the circulation of library materials, but, if he has had the full professional curriculum, he is well prepared to be a college administrator.

The competent librarian is expected to have an understanding of the basic principles of administrative organization, personnel management, public relations, and budgeting. In the librarian's professional journals economy and efficiency of operations is a subject of frequent discussion. And in his efforts to stretch the dollar so as to provide the maximum of services, the librarian and his colleagues often have concerned themselves with intricate cost studies.

The familiarity of the competent, professionally trained college librarian with budgeting and finance is unquestionably a blessing to the administration of an institution. This familiarity of the librarian with budgetary and financial technics can, however, put the president and the business officer of the institution on the defensive when proposed operating budgets are being considered. The librarian can be expected to use his knowledge of library finance to obtain the largest possible support for his unit. The president and business manager must therefore also be familiar with the commoner methods of analyzing library expenditures, in order that the soundness of the librarian's well-supported requests may be accurately appraised.

"Libraries" is one of six principal categories under educational and general expenditures. Under this category, the total direct expenditures of the institution for library services should be reported--salaries, purchase of books and other reading and research materials, binding, and all other library expenses such as supplies, printing and transportation, but <u>excluding</u> capital outlay.

Percentage Figure Good Index

The two basic methods of analyzing expenditures described earlier are frequently applied to the library. These two methods yield figures showing the percentage of total educational and general expenditures devoted to libraries and the amount per student used for this function. The percentage figure reflects the adequacy of support for library services compared to the support given other educational and general functions such as administration, instruction, and plant operation and maintenance. It is an index of the relative value that an institution places upon its library service. Librarians are extremely sensitive to fluctuations in this figure and are quick to express alarm when it begins to decline from a previous level.

Data showing expenditure per student for library services are frequently used as a basis for making comparisons among institutions. Any large deviation from the average for institutions that are comparable, with respect to size of student body and level and type of instructional program, should ordinarily prompt institutional officials into a search for explanations. Even when data for comparable institutions are unavailable, an institution will find it useful to compute the amounts expended per student for library services for a series of several years.

Table 7.
Percentage of Total Educational and General Expenditures for Libraries and Amount per Student Expended for This Function for Six State Institutions of Higher Education

Institution	Enrollment 1954-55	Percentage of Total Educational & General Expenditures for Libraries		Expenditure per Full-Time-Equivalent Student for Libraries	
		1954-55	Five-Year Average	1954-55	Five-Year Average
"A"	3,727	5.5	5.5	$41.18	$44.32
"B"	1,702	5.3	5.3	36.80	41.36
"C"	925	4.9	4.3	33.73	32.93
"D"	464	5.1	5.4	45.56	53.41
"E"	967	5.7	5.4	35.16	39.79
"F"	174	4.3	4.7	71.53	79.44
Average for all institutions combined		5.3	5.3	$39.57	$43.28

Table 7 shows the percentage of total educational and general expenditures spent for libraries and the amount per student for this function for six state institutions of higher education. The data shown are for the last completed fiscal year 1954-55 and the averages for the

five-year period beginning with 1951-52 and including the budgeted funds for 1955-56.

Comparison of the percentage figures for 1954-55 with the five-year averages indicates that the institutions maintain a remarkably uniform policy of library support from year to year.

The expenditure per full-time-equivalent student for libraries also shows a fair degree of stability. In 1951-52 the average for the six institutions was $42.81; in 1952-53, $46.24; in 1953-54, $45.11, and in 1954-55, $39.57. Library expenditures budgeted by the six institutions for 1955-56 provide for an average of $43.37 per student, which comes close to the combined five-year average of $43.28. The expenditure per student for 1954-55 was less than the individual five-year average at every institution but one.

The two institutions with the smallest enrollments, "D" and "F," have the highest expenditure per student for library services. The library services at these two institutions are neither more adequately supported than at the others nor of better quality. The comparatively high expenditure per student reflects the inherent inefficiency of institutions with small enrollments. It has been demonstrated in several studies that a small institution, in order to maintain an adequate library service, has to have almost as large a budget for such items as books and periodicals as an institution with a much bigger enrollment.

Data on expenditure per student for library services have somewhat less stability from year to year than the percentage figures showing distribution of expenditures for various educational and general functions. For that reason unit cost data for library services, if used for inter-institutional comparisons, should be for the latest possible fiscal year. The most readily available source of recent data on library expenditure per student is the journal, College and Research Libraries. This quarterly publication annually compiles and publishes library statistics for the last completed fiscal year for a group of approximately 275 institutions.

Another source of up-to-date information on library expenditures is the "Statistics for College and University Libraries," issued annually by the Princeton University Library. This report includes data only for a selected group of large university and college libraries, and is of limited value to small institutions for purposes of comparison.

Data showing the proportion of total educational and general expenditures devoted to libraries and the amount per student expended for this purpose give only a general picture of library finances. If the administrator finds that his institution devotes either a larger or a smaller percentage of its total educational and general expenditures to library service than other institutions on the average, or that the amount expended per student for this function differs from the average,

these facts do not pin-point the spots where correction may be needed. A more detailed analysis of library expenditures is necessary to suggest a proper course of administrative action.

Table 8 shows the amounts and percentage of total library expenditures devoted to four object items--salaries, books and periodicals, binding, and other library expenses--in six state institutions of higher education for 1954-55. Expenditures per student for each of the four budget items also are shown.

Considerable research has been done on the percentage relationship of the amounts budgeted for the various objects of library expenditures. It is generally accepted among librarians that a properly organized library budget designates from 55 to 65 per cent of its total for salaries, from 30 to 35 per cent for books, periodicals and binding, and from 5 to 10 per cent for other library expenses. These figures are by no means hard and fast, and slightly different distribution patterns are given by some writers on library administration.

Waples, in 1936, studied the relationship between various kinds of per student expenditure data and excellence of library service. He found that the amount expended per student for library salaries, if it is to be used as a reliable criterion of excellence of library service, should be weighted for enrollment. In other words, a college with a small enrollment should spend more per student for library salaries in order to maintain a quality of service comparable to that of institutions with larger enrollment.

The North Central Association of Colleges and Secondary Schools has since used the amount expended per student for library salaries, weighted for enrollment, as one criterion of quality of library service. Waples also established that the average annual expenditure for books and periodicals for a five-year period was a more reliable index of quality of library service than the amount expended per student for this budget item. Prior to Waples' study, the North Central Association had urged institutions to spend at least $5 per student annually for books and periodicals. This standard was abandoned following his finding.

The experience in New Mexico has been that when an institution is hard-pressed for funds, the library budget for purchase of books and for binding tends to be among the first items to suffer reduction. Such cuts, however, seldom seem to result in any permanent saving. An institution with a reasonably efficiently operated library will have to make up the postponed book purchases within a relatively short time if the quality of its services is not to suffer damage.

Another important factor in analyzing the staffing of the library is the distribution of personnel and salary payments among the various employee categories.

Table 8
Analysis of Library Expenditures, by Object, for 1954-55
for Six State Institutions of Higher Education

Expenditure Item	Institution A	B	C	D	E	F	Average for 1954-55	Five-year Average for All Institutions Combined
Percentage of Total Library Expenditures for:	%	%	%	%	%	%	%	%
Salaries	61.5	63.0	60.6	51.4	66.0	44.4	60.9	61.0
Books and periodicals	26.8	27.1	25.6	33.1	19.3	42.5	27.0	26.8
Binding	5.9	4.8	7.2	3.1	8.8	10.6	6.1	5.4
Other library expenses	5.8	5.1	6.6	12.4	5.9	2.5	6.0	6.8
Library Expenditure per Student for:								
Salaries	$25.34	$23.17	$20.43	$23.44	$23.22	$31.74	$24.08	$26.40
Books and periodicals	11.03	9.99	8.65	15.09	6.77	30.40	10.67	11.61
Binding	2.44	1.76	2.41	1.40	3.10	7.60	2.42	2.34
Other library expenses	2.37	1.88	2.24	5.63	2.07	1.79	2.39	2.93

In six New Mexico institutions, in 1955-56, 66.4 per cent of library salary expenditures were for professional staff, 18.3 per cent for nonprofessional staff, and 15.3 per cent for student help.

There is considerable variation in institutional policies regarding the extent of reliance on student help. The use of student help in libraries is a common practice among collegiate institutions, and can be justified for a number of good reasons. Many students have pressing need for the funds they earn in order to stay in college. Working in the library also can contribute to the education of the student. The value of a student's service in a library depends greatly upon the degree and expertness of supervision exercised by members of the professional staff.

The data on ratio of professional library staff members to nonprofessional employees show a wide variation among these six institutions. The average for the six institutions is about 1.50 professional employees to each nonprofessional. This average approximates the medians for several groups of collegiate institutions reported for 1953-54 by the College and Research Libraries.

McNeal recently questioned the existing ratios of professional to nonprofessional employees in college and university libraries as an uneconomical use of professional talent. He suggests that one professional staff member should be able to direct the activities of two nonprofessional employees. We are inclined to agree with this suggested standard for library staffing.

A ratio of two or more professional librarians to one nonprofessional employee would seem to indicate that professional staff members are spending too much of their energy and time doing work of clerical or semi-clerical nature. Inasmuch as average salaries for professional staff members are more than twice those for nonprofessional employees, the suggestion of a low ratio of professional to nonprofessional employees is certainly in the interest of economy. Such a policy should enable an institution to employ fewer but more highly qualified staff members for those library operations that require well prepared professional personnel.

The American Library Association has done considerable research on the problem of library staffing needs and has developed an interesting formula to guide collegiate institutions in determing the number of professional staff members that should be employed. This formula takes into account (1) the level of instructional program maintained by an institution and (2) the differential demands for library service by faculty members, graduate students, honor students, upper-class undergraduate students, and lower-class undergraduate students. Each lower-class undergraduate student, for example, is given a weighting of one service unit and each faculty member a weighting of five service units. Unfortunately the evidence for the validation of these weightings and standards is not presented.

PLANT OPERATION AND MAINTENANCE

We shall limit our discussion to the kinds of analysis of expenditure data that, in our experience, have been useful in giving legislators and supporters of an institution an understanding of the problems of plant operation and maintenance. The particular focus is on the kinds of analyses that may be made of expenditures that will be helpful in interpreting budget requests and in suggesting to institutional officials areas of plant operation activities in which economies might be effected.

We are far from satisfied with the limited kinds of data that are generally used for relating needs and efficiency of plant operation activities to budgetary requests.

In the 1935 report of the National Committee on Standard Reports for Institutions of Higher Education and in the 1952 report of the National Committee on the Preparation of a Manual on College and University Business Administration, plant operation and maintenance costs are classified as expenditures for educational and general purposes. Subdivisions suggested for inclusion under this category are: administration (or supervision); janitorial service; repair of buildings; repair of furniture and equipment; care and maintenance of grounds; heat, light, water, power and gas; police and watchmen; property insurance; general trucking, and rent of property for institutional purposes. The reports of both the national committess recommend that expenditures for plant operation and maintenance incurred by auxiliary enterprises and other units not directly related to the educational program of the institution be excluded from the amounts reported under educational and general.

The function of a buildings and grounds department is to operate and maintain the physical stage on which the instructional and research activities of a college or university take place. The department is a service unit existing for the convenience and benefit of faculty and students. These services are essential and, when carried out efficiently and unobtrusively, add greatly to the effectiveness of an institution. However, it must be recognized that a smoothly functioning department of buildings and grounds is not always adequately appreciated by students, faculty members, or academic administrative officers. Budgetwise the expenditures for plant operation and maintenance constitute an unavoidable overhead, a deduction from the funds available for such direct instructional purposes as faculty salaries, classroom and laboratory supplies, and library. For that reason, expenditures for plant operation and maintenance should claim as small a portion as possible of the total amount spent or budgeted for educational and general purposes, consistent with effective service.

The Board of Educational Finance, as a central budgetary coordinating agency, first began to exercise some influence over the patterns of expenditure in the New Mexico educational institutions in 1952. Since

that time the proposed budgets for plant operation and maintenance have been scrutinized critically, in the interest of stretching the budget dollar so as to leave the largest possible amount of income for the support of strictly educational services. The board has suggested to the institutions that the expenditures for plant operation and maintenance should, as nearly as possible, be kept within the limit of 15 per cent of the total educational and general expenditures. Budget estimates that exceed this percentage are examined in considerable detail and must be thoroughly justified.

There is evidence that the 15 per cent limit is perhaps a bit low. Only two of the six institutions have been able consistently during the period to stay reasonably close to this limit. Three of the institutions have always been considerably above the limit, one of them spending more than twice the suggested percentage every year for plant operation and maintenance. The board still adheres to its 15 per cent rule but treats this limit with reasonable flexibility, only insisting that deviations be thoroughly justified.

Before attempting to delve more deeply into the expenditure data, we might review the major factors that contribute to high plant operation and maintenance costs. According to the many plant officials and others who have studied this problem, the following factors can be listed:

1. Neglect of maintenance factor in planning new buildings. An institution, in an effort to economize or through sheer ignorance, sometimes leaves out building features which over a period of years more than pay for their initial outlay by cheaper operation and maintenance expense.

2. Continued use of a building after it has outlived its usefulness and becomes expensive to operate and maintain.

3. Overexpanded plant facilities. An institution should make optimum use of its existing plant facilities. Too frequently an institution will engage in a plant expansion program, when a study of space utilization would show that it could accommodate a much larger enrollment within its existing facilities.

4. Poor plant staffing practice. This usually takes two forms: overstaffing and employment of poor quality personnel. Overstaffing is particularly likely to occur in the janitorial crew. The employment of poor-grade personnel is particularly uneconomical in supervisory and technical posts. Use of student labor may result in an inordinately high cost.

5. Failure to mechanize. With the high cost of labor, no institution can these days afford to overlook mechanization as a means for reducing man-hours of labor in plant operation and maintenance activities.

6. Uneconomical purchasing practices.

7. Tolerance of outmoded or badly worn maintenance equipment and utility facilities. Institutions oftentimes wait too long to replace worn-out, leaky steam lines, boilers and equipment that are in need of constant repairs.

8. Lack of a preventive maintenance program. This appears to be a favorite topic of conversation among plant engineers, and justly so. Preventive maintenance is good administration. Lack of a preventive maintenance program generally results in a backlog of delayed maintenance.

9. Misclassification of capital outlay as plant maintenance. Sometimes plant improvement and betterment projects are carried on by the regular maintenance staff of the college or university. The expenditures for such projects, unless special care is taken in the financial accounting, are made from the ordinary budget for repairs and maintenance. The cost of plant operation and maintenance in the report of expenditures for current educational and general purposes is incorrectly inflated when it includes outlays for such purposes as the construction of small buildings (not involving any replacement) or for permanent improvements to the campus grounds.

10. An uncooperative faculty and student body. Conclusions as to the extent to which an uncooperative attitude of students and faculty members contribute to a high cost of plant operation and maintenance will depend on one's point of view. Faculty members and students probably look on the problem differently from the superintendent of buildings and grounds. Many plant officials consider this an important item in the list of factors affecting the cost of plant operation and maintenance.

11. Institutional policy of maintaining a show place. While every college should have an attractive campus, occasionally one finds an institution that appears to be maintaining a show place of ivy covered walls, arbored walks, acres of lawn and flowers, and monumental buildings. A campus beautiful undoubtedly has its merits, such as enticing students to enroll, but its maintenance cost may make serious inroads on the institution's faculty salary budget.

Some Conditions Unavoidable

With good administration an institution can avoid or correct every one of these 11 situations that contribute to high costs of plant operation and maintenance. There are other conditions, however, which an institution cannot avoid and must live with. These have to do chiefly with the geographical location of an institution.

An institution located in a northern state cannot avoid relatively high expenditures for heat and light, in comparison to its counterpart

in a southern state. An institution located in a large metropolitan community, particularly in or near a slum area, will probably have to expend a rather large amount for police and watchmen service, but a college located in a small rural community would probably have small need for campus police protection. An institution situated in a large industrial city or near an important installation of the federal government may have to pay considerably higher wages, in comparison to its counterpart in a rural community, to employ and maintain its buildings and grounds crew. No amount of good administration can change these particular conditions.

Situations such as the foregoing must be clearly kept in mind in the course of expenditure analysis.

A simple method of analyzing expenditures for plant operation and maintenance is to list the amounts for each object under this category for a series of several consecutive years. Table 9 shows how this might be done.

Data reflecting the object classification of expenditures may be useful when analyzed in terms of the percentage that expenditure for each object item is of the total plant operation and maintenance costs. The data resulting from this procedure are shown in Table 9.

The figures in this table give a quick picture of the phases of plant operation and maintenance that are the most costly. For this group of six institutions, three items, utilities, repair of buildings and equipment, and janitorial service, consume on the average approximately 70 per cent of the total plant operation and maintenance budget. The report of the "Sixty College Study" also indicates that these three items constitute the major portion of expenditures for this particular purpose.

An institution interested in economy and efficiency in plant operations should reap the most benefit by a careful study of these three activities. Also when rather large differences in expenditure patterns are noted, such as the high percentage of total plant operation and maintenance budget committed for insurance at institution "B," a search for explanations should be undertaken by the administrative officials.

At institution "B" the item principally responsible for the large increase in percentage of total educational and general expenditures devoted to plant operation and maintenance is clearly shown to be repairs of buildings and equipment. The budget for this purpose for 1955-56 is almost three times as large as the actual expenditures for the previous year. For many years this institution had delayed repairs and maintenance because of a shortage of funds. The day of reckoning had to come sooner or later.

Table 9
Percentage of Total Expenditures for Plant Operation and Maintenance for Each Object

Object	Year	Institution A	B	C	D	E	F	Average
Administrative or supervisory office	1954-55	6.7	8.8	7.7	4.9	4.8	5.3	6.9
	1955-56	7.0	8.1	8.6	4.9	3.8	5.4	6.9
Janitorial service	1954-55	17.6	12.5	18.9	19.8	34.7	9.1	17.2
	1955-56	15.7	9.7	19.1	18.6	30.4	9.3	15.4
Maintenance of grounds	1954-55	8.7	8.2	9.8	13.0	8.1	8.0	8.9
	1955-56	9.0	8.5	11.5	13.2	7.5	10.6	9.4
Repairs of buildings and equipment	1954-55	33.9	16.5	10.8	9.0	17.9	11.6	22.0
	1955-56	34.6	30.7	11.0	17.1	30.4	10.1	27.5
Heat, light, water, power, and gas	1954-55	22.7	36.9	38.5	33.0	23.6	49.0	31.3
	1955-56	23.6	29.4	35.0	26.6	19.0	47.4	28.1
Police and watchmen	1954-55	3.9	0.2	4.2	2.0	1.3	2.1	2.6
	1955-56	3.5	0.5	3.8	1.5	1.4	2.2	2.3
Autos and truck expense	1954-55	3.7	1.6	2.1	3.8	1.7	7.3	3.2
	1955-56	3.3	1.2	2.6	5.4	1.5	6.7	3.0
Insurance of plant and equipment	1954-55	2.4	14.0	6.5	12.3	7.9	5.1	6.9
	1955-56	2.5	11.0	7.0	9.2	5.5	4.7	6.1
Other expenditures	1954-55	0.4	1.3	1.5	2.2	-	2.5	1.0
	1955-56	0.8	0.9	1.4	3.5	0.5	3.6	1.3

Another method of analyzing expenditures for plant operation and maintenance is to compute unit costs, such as amount per student, or per square foot of floor area, or per cubic foot of plant space. The choice of the unit depends upon what one is trying to discover or demonstrate.

The significance of figures for cost per student in the analysis of expenditures for plant operation and maintenance rests on the principle that the size of the physical plant should be related to the size of student enrollment. The unusually high expenditure per student for plant operation and maintenance at institution "F," year after year, indicates that it may have more instructional space than necessary for the size of the student body. (See Table 10.)

Table 10
Amount per Student Expended for Plant Operation and Maintenance for Six State Institutions of Higher Education

	Institution						Six Institutions Combined
	A	B	C	D	E	F	
1951-52	$139	$107	$125	$247	$101	$552	$145
1952-53	130	129	178	252	99	574	152
1953-54	122	127	184	215	117	582	147
1954-55	113	125	144	176	92	529	129
1955-56	123	186	142	217	126	516	153
Five-Year Average	125	138	152	221	108	550	145

The per student cost data for institution "D" suggest that it, too, might be suffering, although to a lesser degree, from this form of inefficiency. The utilization of instructional space must therefore be considered, and data on this point are necessary in any comprehensive analysis of expenditures for plant operation and maintenance.

Institution "F," which over a period of at least five years has had the highest per student expenditure for plant operation and maintenance, has the lowest percentage of possible utilization of instructional space as measured by either the room-period basis or the student-station basis. With the same instructional plant facility, institution "F," without undue discomfort, should be able to accommodate more than twice the number of students it had in the fall of 1953. For some time to come efforts by this institution to obtain funds to construct additional instructional facilities will have to be justified by reasons other than lack of space to accommodate increased enrollments.

In addition to the technics for analyzing plant operation and maintenance costs thus far discussed, there are others that are more frequently referred to by plant superintendents in their literature. One of these is the use of the square foot of floor area as a divisor for computing unit costs. The expenditures for each of the object

items under plant operation and maintenance are expressed as amounts spent or budgeted for each thousand square feet of floor space. Gross expenditure figures, prior to proration of costs to the auxiliary enterprises and to the organized activities, have been used. The figures for floor area are for the entire physical plant, including auxiliary enterprises and organized activities.

The technic of analyzing expenditures on the basis of plant area is obviously not equally applicable to all the various objects. Expenditures for the supervisory office, police and watchmen, and autos and trucks expense would logically seem to have less relationship to the total square feet of floor area than expenses for janitorial service and repairs of buildings and equipment.

Another spatial concept frequently used by plant engineers as a divisor for computing unit costs of plant operation and maintenance is the cubic foot. Plant officials, in general, appear to favor the cubic foot, rather than the square foot, in computing unit costs of such services as maintenance and heating of buildings. The cubic foot is perhaps a somewhat better unit than the square foot as a measure for use within an institution, particularly when comparison is to be made between different types of buildings such as a gymnasium and a residence hall. For comparisons between and among institutions, however, the addition of the third dimension to the square foot unit has small effect on the accuracy with which the size of the plant is portrayed.

The data in Table 9 prompted several institutional officials to re-examine their insurance practices. At least one institution came to the conclusion that it was overinsured. In another, question was raised as to whether improvement in its fire protection facilities might result in economies through lower insurance rates. Several institutional officials and a few legislators, on examining these data, suggested that a study be made to determine if it might not be more economical for the state institutions to form their own group insurance program. Thus, the fact that an analysis technic is far from being perfect does not preclude the use of the data to suggest action that may lead to beneficial results.

The kinds of analysis of plant operation and maintenance costs that have been presented in this discussion are by no means exhaustive. Competent plant officials use these and many other more imaginative technics to measure efficiency of operations and to derive information that help them make administrative decisions. There is still plenty of opportunity for the invention of new kinds of analyses that will be useful in determining the needs for budgetary support of the function of plant operation and maintenance in colleges and universities.

ANALYSIS OF EXPENDITURES FOR INSTRUCTION

We now come to the most important category of expenditures for educational and general purposes--those for instruction.

This is the heart of the college program, the very reason for the institution's existence. Also, it normally requires a larger expenditure than does any other institutional function. A college or university may engage in many other public services, such as organized research, extension activities, and public entertainment in the form of intercollegiate athletics, but instruction is universally recognized as its primary function.

Paradoxically, however, expenditures for instruction have been subjected to less critical analysis than those for some other ancillary activities, such as libraries and plant operation and maintenance. This situation in all probability reflects the dogma, espoused by academic deans and faculty members, that no college or university can spend too much for instructional purposes.

There are never enough funds adequately to compensate well qualified faculty members for their services, never enough funds to purchase all the supplies and equipment that facilitate and improve the instructional programs, never enough funds to relieve faculty members of their many sundry chores of clerical nature, and never enough funds to send faculty members to every professional conference they should attend. Consequently, it is assumed that every dollar devoted to instructional purposes is a dollar well spent.

We ourselves are not disbelievers of this dogma; we believe in it as fully as any academic dean or faculty member. In fact, one of the primary purposes of any analysis of expenditures for educational and general purposes is to determine if an institution is putting every dollar it possibly can into the function of instruction.

Why, then, bother to analyze expenditures for instruction? One reason is this: There are many ways to spend a dollar. While every dollar devoted to instructional purposes is a dollar well spent, one must ask himself if it could have been used more effectively.

For example, although few institutions, if any, are in a position to pay each faculty member the full measure of his or her value, they can and do have the obligation to reward the competent more adequately than the less competent. An institution has the responsibility of attracting and retaining the most capable faculty it can with the funds available.

A second reason for analyzing instructional expenditures is to determine financial needs as they relate to efficiency of operation.

Granted that an institution can nearly always use more money for the support of its instructional programs, is it making the maximum use of its present teaching staff and facilities? One needs to study only a few colleges to observe that, with the same or nearly equal faculty-salary budget, one institution regularly manages to serve more students than another of comparable quality and curriculum. The latter institution certainly has the obligation to show why it cannot accommodate additional students with its present staff, in any request for funds to employ more instructors.

A third reason, one that is peculiar to a central coordinating agency for a group of colleges and universities, such as the New Mexico Board of Educational Finance or an education board of a religious denomination, is to equalize, as nearly as possible, the financial support of the member institutions.

A fourth and final reason for analyzing expenditures for instructional purposes is to develop such data as will help convey to legislators and to private donors an accurate picture of the financial needs of higher education.

In the ensuing discussion of the technics for the analysis of instructional expenditures, we shall use for illustrative purposes data gathered since 1951-52 for six New Mexico state institutions of higher education. We shall comment on the relative effectiveness of the various analytical technics and the use made of the resulting data.

What Expenditures Include

Expenditures for instruction, as defined in the 1935 report of the National Committee on Standard Reports for Institutions of Higher Education and the 1952 report of the National Committee on the Preparation of a Manual on College and University Business Administration, include salaries of college or divisional deans, faculty members, clerical employees, instructional supplies and equipment, and other departmental expenses. The last subcategory, other departmental expenses, consists of such items as staff benefits (if not budgeted under administration and general expenditures) and faculty travel.

The two basic technics of analyzing expenditures discussed in earlier articles are applicable to those for instructional purposes. These two technics yield data showing the percentage of total education and general expenditures budgeted for instruction and the amount per student used for this function. Table 11 shows the figures resulting from the application of these two technics to the expenditures for instruction for six New Mexico state institutions of higher learning.

Note in Table 11 that the two institutions with the smallest enrollments, "D" and "F," consistently devote a relatively small percentage of total educational and general expenditures to the directly productive function of instruction. Small institutions, those with

Table 11
Percentage of Total Educational and General Expenditures for Instruction, and Amount per Student for This Function, in Six State Institutions of Higher Education

	Year	Institution A	B	C	D	E	F	Six Institutions Combined
Percentage of Total Educational and General Expenditures for Instruction	1951-52	59.6	67.2	61.6	44.0	61.3	48.8	59.5
	1952-53	60.1	61.8	60.4	43.5	61.7	46.9	58.5
	1953-54	61.1	63.1	57.9	48.9	56.6	46.9	59.0
	1954-55	61.0	61.8	60.1	50.4	54.4	48.4	59.0
	1955-56*	61.0	58.7	58.2	50.2	57.1	49.7	58.5
Expenditure per Full-Time-Equivalent Student for Instruction	1951-52	$494	$548	$415	$426	$455	$857	$494
	1952-53	490	480	544	459	463	780	496
	1953-54	507	470	486	478	432	815	494
	1954-55	460	428	417	450	334	815	440
	1955-56*	485	510	424	525	456	848	490
Estimated Full-Time-Equivalent Student Enrollment, 1955-56, Entire Year		4115	1825	1020	497	1022	189	

*Data for 1955-56 based on budget estimate.

enrollments of less than a thousand students, are inherently less efficient than those with larger enrollments, and the situation can be corrected only as an institution enrolls more students.

The six institutions combined regularly manage to get approximately six out of every ten dollars expended for educational and general purposes into the directly productive function of instruction. This appears to be about as high a ratio as can be maintained in institutions with enrollments that permit economical operation.

The data on amount per full-time-equivalent student for instructional purposes, shown in Table 11, are useful in answering questions pertaining to the equality of support among institutions. The New Mexico Board of Educational Finance operates on the principle that each of the state institutions should be given sufficient financial support to develop and maintain instructional programs of similar quality, taking into account the academic level, undergraduate and graduate, and the extent of professional and highly technical curriculums. In other words, any program offered at one institution should be supported at a quality level approximately the same as that of comparable programs in the other institutions.

Any wide variations in expenditure per student must therefore be explainable in terms of differences in such factors as level and type of instructional programs and size of enrollments. For example, institution "F," which consistently expends the highest amount per student for instruction, has too small an enrollment to permit economical operation. It has a very low student-faculty ratio and a high proportion of classes enrolling fewer than 10 students. Its curriculum consists exclusively of undergraduate and graduate programs in several highly specialized fields of technology.

We wish to caution the reader against concluding that the New Mexico procedure of equalizing the support of the state colleges and universities is to appropriate sufficient funds to enable each institution to maintain a given level of expenditure per student. The procedure of which we speak is a much more complex affair. The value of the figure on expenditure per student for instruction for a given institution lies in the fact that it constitutes a summary, or gives a quick picture of the adequacy of support for this function relative to other institutions. In our experience, the figure is a good <u>subsequent</u> check on the soundness of the procedure that has been used to develop the instructional budget. Information on expenditure per student is treated as a <u>result</u> of the procedure, not as its starting point.

In the definition of the expenditure category of instruction, it was noted that this function consisted of a number of different object items. It is frequently useful for institutional administrators to have available comparative data for other institutions on these object items.

The most important categories of instructional expense are shown in Table 12 together with the amounts per FTE student and the per cent of the total spent by six New Mexico institutions in 1955-56.

Table 12
Instructional Expenditures, By Object,
Six Institutions, 1955-56

	Dollars	Per Cent
Total	$489.83	100.0
a) Instructional Salaries	368.02	75.1
b) Instructional Supplies and Equipment	29.84	6.1
c) Clerical Service for Faculty	16.28	3.3
d) Student employment	16.36	3.3
e) Staff benefits	19.35	4.0
f) Staff travel	2.84	0.6
g) Academic vice president	9.85	2.0
h) Graduate school office	2.23	0.5
i) Deans' offices	16.17	3.3
j) All other (faculty research, etc.)	8.89	1.8

Each of the object items under the budget category of "instructional expenditures" can be subjected to further analysis, which frequently produces interesting data of aid to institutional administrators. For example, expenditures for out-of-state travel by the faculty of the New Mexico institutions have been the topic of two intensive studies by the Board of Educational Finance. The amount expended for faculty travel is relatively small. For the six institutions combined it claims only 0.6 per cent of the budget for instructional services. One might conclude that the item is hardly important enough to warrant much analysis.

But, oddly enough, over a period of years out-of-state travel by faculty members has been the subject of more comment and adverse criticism by legislators, state fiscal officers, and newspaper columnists than perhaps any other single institutional activity. It has therefore been necessary to make detailed analyses of expenditures for the travel item for the purpose of developing a policy statement that is defensible from an academic point of view and understandable to the public.

The remainder of this discussion will deal with what is, without exception, the most important item under instruction--the expenditures for instructional salaries. These expenditures in the New Mexico

institutions claim about three-fourths of the budgets for the function of instruction.

Analysis of Instructional Salaries

The effective use of funds available for instructional salaries can be measured by two kinds of data: (1) those that show distribution of salaries among the faculty, and (2) those that pertain to the productiveness of the faculty and the economy of the instructional programs.

The first kind of data is found frequently in the literature on higher education and is familiar to virtually all college and university administrators. The second kind of data includes such measures as student-credit-hour production per faculty member and expenditures for instructional salaries per student-credit-hour. Analyses that yeild both these types of data are necessary in any comprehensive study of effective expenditure of funds for instructional salaries.

From the point of view of a comprehensive analysis of institutional operations, faculty salaries have two important characteristics: average and range. These two salary characteristics have direct bearing on the success of the institution in attracting and holding competent faculty members. The significance of a high average faculty salary to the well-being of an institution is recognized by virtually all college and university administrators, but recognition of the importance of a wide range in salaries among the academic ranks and within each rank is not as universal. In two institutions with the same average faculty salary, all other factors being equal, the one with the greater range in salaries is likely to have the better staff. Competent young faculty members frequently will be attracted to and elect to remain with an institution at a lower salary than they might receive elsewhere, if prospects for high salaries are good with academic advancement.

Table 13 shows the faculty salaries for 1955-56 for two state institutions of higher education. The data reflect two divergent faculty salary practices, though the average (mean) salary for all ranks combined is about the same at each institution. Institution "A" maintains a reasonably wide range in salaries within each rank and allows for overlapping between two adjacent ranks. Institution "B" follows the practice of a uniform salary for all members of a given academic rank, with only occasional exceptions; professors who are department heads receive a slightly higher salary than those who are not, and, at the rank of assistant professor, some deviations from the salary schedule occur as the result of "salary adjustments." On the whole, institution "B" makes no attempt to recognize differences in individual merit, except by means of promotion in rank, or to encourage the most capable into greater effort through salary inducements. Great significance

attaches to the fact that the top salaries at every rank are higher in institution "A" than in institution "B." It is these top salaries that attract and retain first class faculty members.

Table 13
Faculty Salaries for 1955-56 for Two State Institutions of Higher Education, Nine-Months Basis*

Institution		Professors	Associate Professors	Assistant Professors	Instructors	For All Ranks
"A"	High.....	$8800	$6500	$5900	$4400	$8800
	Low.....	6000	5250	4000	3600	3600
	Mean.....	7125	5773	5025	3985	5772
	Number at rank.	69	45	70	23	207
"B"	High.....	$7500	$6228	$5664	$4368	$7500
	Low.....	7272	6228	4740	4368	4368
	Mean.....	7351	6228	5137	4368	5784
	Number at rank.	26	15	36	17	94

*Includes only faculty members who devote full time to instruction.

We are firmly convinced that, over a period of years, the salary policy followed in institution "A" will permit the attraction and retention of a much more capable faculty than the policy of institution "B," assuming that each has the same amount per faculty member for salaries. In fact, institution "A" might well be encouraged to increase the range of its salaries, particularly at the upper levels. One nationally recognized institution recently visited maintains a ratio of about 4 to 1 between its highest and lowest faculty salary, or a range from about $4000 for the lowest salaried instructor to about $16,000 as the top for a professor.

Closely related to the question of salaries is that of academic rank. Table 14 shows the staffing pattern of six state institutions of higher education for 1952-53 and 1955-56. The data show that no one pattern fits all the institutions, and even in the relatively short period of four years wide variations occur within a single institution in the percentages at each rank. In 1952-53 institution "C," for example, used only two ranks: "professor" and "instructor."

This organizational pattern, while it is not to be recommended, is not unusual in small institutions. By 1955-56 institution "C" had reclassified its faculty into four academic ranks, which is the more conventional pattern.

Table 14
Academic Ranks of Faculty Members of Six State Institutions of Higher Education

Institution	Year	No. of Faculty Members	Percentages of Each Rank			
			Professor	Assoc. Prof.	Asst. Prof.	Instructor
"A"	1952-53	190	27.4	26.3	33.7	12.6
	1955-56	234	35.9	20.1	32.5	11.5
"B"	1952-53	157	28.0	14.0	30.6	27.4
	1955-56	167	28.7	13.8	39.5	18.0
"C"	1952-53	58	29.3	--	--	70.7
	1955-56	59	23.7	27.1	42.4	6.8
"D"	1952-53	38	18.4	71.1	7.9	2.6
	1955-56	40	12.5	70.0	7.5	10.0
"E"	1952-53	54	14.8	27.8	24.1	33.3
	1955-56	65	12.3	32.3	41.5	13.9
"F"	1952-53	16	18.8	25.0	50.0	6.2
	1955-56	19	26.3	42.1	26.3	5.3
All institutions Combined	1952-53	513	25.5	23.8	25.7	25.0
	1955-56	584	28.1	24.5	34.6	12.8

*Includes all persons with academic rank, whether part-time or full-time member of teaching staff.

In contrast to the others, institution "D" accords the rank of "associate professor" to more than two-thirds of its faculty, and more than 80 per cent of its faculty are in the upper two ranks. Its faculty is no more outstanding than those of the other institutions from the standpoint of training or experience or scholarly maturity. Under the circumstances, it must be concluded that at institution "D" academic rank is much easier to obtain than in the faculties of the other five institutions.

Occasionally the question arises as to whether or not there is an ideal staffing pattern. If there is such a pattern, it would probably be for an institution to have all "full professors." Unfortunately a faculty organization of this ideal type, within any reasonable concept of the qualifications of a "full professor," is not practicable. As a practical guide, we generally advocate for a degree-granting college

a staffing pattern with a nearly equal number of faculty members at each of the four conventional ranks. An institution might have a larger or smaller proportion in the upper two ranks, depending upon its success in attracting and retaining mature scholars.

Another element of faculty organization that has important bearing on salaries is the number of students per faculty member. Table 15 illustrates the possible effects of varying student-faculty ratios on the average salary for an institution with an enrollment of 1000 students and a total instructional salary budget of $350,000. A student-faculty ratio of 10 to 1, requiring 100 faculty members, would result in an average salary of $3500. With the same salary budget, an institution could provide for an average faculty salary of $5225 by employing only 67 faculty members, which would result in a 15 to 1 student-faculty ratio. But by employing only 44 faculty members and maintaining a student-faculty ratio of 22.5 to 1, an institution would have the funds for an average faculty salary of $7950.

The impact of a given student-faculty ratio on average salaries for each of the four academic ranks is even more impressive. The average salaries for each of the ranks, shown in Table 15, are computed on the assumption that there would be a nearly equal distribution of faculty members at each of the four academic ranks. If an institution of a thousand students with a total instructional salary budget of $350,000 were to maintain a student-faculty ratio of 10 to 1, the average salary for instructors would most likely be about $3000 and the average salary for professors not more than $4300. The salary of the highest paid faculty member in this organization would probably not exceed $5500 or $6000. With the same total salary expenditure and a student-faculty ratio of 22.5 to 1, the average salary for instructors could be $4600 and the average salary of professors about $12,000. This faculty organization could provide for several professors whose salaries might be as high as $15,000 or $16,000.

If each of the six student-faculty ratios in Table 15 were to represent a different institution, we have no doubt but that the best faculty would be found in the institution with the average faculty salary of $7950 and a student-faculty ratio of 22.5 to 1. This institution is in the most favorable position to retain its experienced faculty members and to compete with industry, government and other colleges and universities for top quality talent. It is also in the best position to attract promising young faculty members because it can offer both a decent starting salary and prospects for high salaries with advancement. Undoubtedly there are certain advantages to a low student-faculty ratio, but these advantages accrue only if an institution can, at the same time, afford to support a high quality staff. Too frequently the price of maintaining a ratio of 12 or 13 students per faculty member is a low average faculty salary. Scholars on the faculty who insist that a low ratio of students to instructors is essential to a good academic program usually fail to realize what a terrific price they pay in low salaries for that condition. Nor is

Table 15
Six Possible Faculty Organizations for an Institution With an Instructional Salary Budget of $350,000 and an Enrollment of 1000 Full-Time Students

Funds Available for Instructional Salaries	Students per Faculty Member	No. of Faculty Members	Average Faculty Salary	Number and Average Salary at Each Rank							
				Professor		Assoc. Prof.		Asst. Prof.		Instructor	
				No.	Average Salary	No.	Average Salary	No.	Average Salary	No.	Average Salary
$350,000	10.0	100	$3500	25	$4300	25	$3500	25	$3200	25	$3000
350,000	12.5	80	4375	20	5250	20	4650	20	4000	20	3600
350,000	15.0	67	5225	17	6650	16	5675	17	4600	17	4000
350,000	17.5	57	6140	14	8400	15	6720	14	5200	14	4200
350,000	20.0	50	7000	12	10,000	13	7830	13	5800	12	4400
350,000	22.5	44	7950	11	12,000	11	8820	11	6400	11	4600

there evidence that a low student-faculty ratio, of itself, results in a superior academic program. It is much better for a student to be one of 20 or 25 having contact with a first-class scholarly mind on the faculty than to be one of 10 or 12 having contact with a faculty member of the mediocre level of ability that usually results from a low salary scale.

Efficiency of the Instructional Program

Data dealing with such salary characteristics as average, range and staffing pattern, which were discussed in the preceding section, reflect an institution's attempt to attract and hold as good a faculty as it possibly can within the limits of funds available for instructional salaries. These data do not, however, give any indication of the general economy of the instructional programs. This requires a different kind of analysis.

The varieties of data on instructional programs that might be collected and studied are numerous. For the purpose of measuring economy of operations, the most relevant are those that show efficiency of use of faculty manpower.

Since Doi and Kettler have discussed the detailed analysis of instructional costs in other articles in this volume, I will conclude with some general observations on the kinds of data that are suitable for this purpose.

1. Extent of different courses taught. The scope of subject matter offerings should be measured in terms of the total credit-hour value (semester-hour or quarter-hour) of all the different courses taught in the institution during any given period, such as an academic year. Some analysts have used the "course" as a unit for expressing the scope of subject matter content. This is not a satisfactory unit, because some courses are given for one credit, some for two or three credits, and others for varying numbers of credits up to five or even 10. For accurate statistics it is necessary to convert the course offerings into a total of their credit-hour value. Each course is counted in the total at its particular credit-hour value. To obtain an indication of the scope of subject matter offered, each course is counted only once, regardless of the number of times it may have been repeated during the year.

In well managed institutions the course offerings are regularly scrutinized by the faculty and the officers of academic administration for the purposes of: (1) combining or redesigning courses in the interest of the best possible integration of the program of instruction; (2) eliminating unnecessary overlapping and duplication of content, and (3) discontinuing courses and programs for which the student demand is insufficient.

One of the unfortunate results of overproliferation of course offerings is the prevalence of an unduly large number of small classes. Even worse, from the point of view of curriculum organization, is the likelihood of loading the programs of students with highly specialized courses at too early a stage in the students' scholarly advancement and of wasting the time of students in useless repetition of content in supposedly different courses.

2. Semester hours of classes taught. This figure differs from that on scope of offerings in that it represents a count of the credit hours of classes taught and not of different courses. It is a measure of the volume of teaching, not the range of subject matter covered. A course may be offered more than once during the academic year. Thus, in calculating the scope of course offerings, a three-semester-hour course would count as three, but if five different class sections of the course were maintained, they would count as 15 in the analysis of semester hours of classes taught.

3. Student credit hours produced. The student credit hour is the best available measure of the "production" of instructional services in the department or institution. It is derived by multiplying the number of students in each class by the number of credit hours the class carries and then adding these products for all the classes taught. The grand total of student credit hours produced in an institution is directly related to the total number of full-time-equivalent students, inasmuch as each full-time student normally earns 30 to 32 semester hours, or 45 to 48 quarter hours, of credits in an academic year.

4. Percentage of credit hours taught in small classes. An important measure of instructional efficiency is the degree of prevalence of "small" classes. This measure may be expressed either in terms of the total credit hours of small classes or the percentage that the credit hours of small classes is of total credit hours of classes taught. The selection of the point at which a class is considered "small" is arbitrary. In an actual analysis, it is advisable to select more than one point, such as fewer than five and fewer than 10 students.

While some small classes may be necessary in any well organized instructional program, the number of classes that enroll no more than four students should be held to the minimum, particularly at the undergraduate level. A class with only two or three students enrolled generally costs the institution just as much for faculty salary as a class with 25 or 30 students. Furthermore, the students themselves do not get as much stimulation from a very small class as from one that is of reasonable size, especially when the instructor, as is nearly always the case, teaches a small class by the same method he would use in a larger one.

5. Credit hours taught in unneeded duplicate sections. In arranging an instructional schedule for a given semester or term, it is necessary to estimate in advance whether the number of students who will enroll in each course is larger than can be accommodated in a single class. Especially in required undergraduate courses, duplicate sections usually must be maintained in order to provide for all the students who enroll. If the estimate of the number of duplicate sections needed is not made wisely, it is easily possible to set up too many and thus to require more instructors than should be necessary.

Minimum of 25 Students

The authors, in their studies of instructional programs, generally proceed on the assumption that each undergraduate class should be filled up to a minimum of 25 students before a duplicate or additional section in the same course is organized during a given term or semester.

6. Unnecessary repetition of courses during the regular academic year. In order to provide suitable opportunity for the arrangement of student programs, it usually is necessary to give some courses in more than one semester or term, especially when the course is one that generally enrolls a considerable number of students. A department sometimes will repeat a course during the regular academic year when the total enrollment for the year is no larger than could readily be handled in a single class in one term or semester. Here again the standard for a wasteful repetition of courses is arbitrary. We generally consider a total enrollment of fewer than 20 students in all sections of a course taught during the regular academic year as indicative of wasteful repetition.

7. Average (weighted) size of classes. An excellent measure of the efficiency of an instructional program is the average size of the classes that are taught. Within reasonable limits, the larger the average size of class the more efficient the use of faculty time and energy. The average size of class must be "weighted" in accordance with the number of credit hours for which each class is taught. For example, a class carrying three semester hours of credit should be counted into the average at three times the weight of a class carrying only one semester hour of credit. In actual practice, the weighted average size of class is derived by dividing the total number of student credit hours produced by the total credit hours of classes taught.

8. Average student credit hours produced per full-time-equivalent faculty member. The average student credit hours produced per full-time faculty member is the best single measure of efficiency of operation of an instructional program. Within reasonable limits, the larger the average number of student credit hours per faculty member, the more efficient the instructional program. This figure is obtained by dividing the total number of student credit hours produced by the total number of full-time-equivalent faculty members.

Two factors are involved in the average number of student credit hours produced by a full-time faculty member: the average credit hours of teaching per faculty member, and the average weighted size of classes. For example, if the average faculty member teaches 12 credit hours per semester, or 24 per year, and the average weighted size of classes is 21, the average number of student credit hours produced would be 504. If faculty members teach an average of 15 credit hours per semester, or 30 per year, and if the average class size is 17 students, the average student-credit-hour production per faculty member would be 510.

In general, improvement in student-credit-hour production per faculty member should be accomplished by increasing the average size of classes rather than by increasing the teaching loads of faculty members. In a well managed institution the average teaching load of faculty members is held as low as possible, while the student-credit-hour production per faculty member is held as high as possible.

9. Instructional salary cost per student credit hour produced. This measure of cost is derived by dividing the total expenditures for instructional salaries by the number of student credit hours produced. It must be recognized that the instructional salary cost is not the total cost of producing a student credit hour. Some departments, such as the biological or physical sciences, have rather heavy expenditures for instructional materials and laboratory supplies. Other departments, such as the social sciences and the humanities, require extensive provision of library resources. In addition to these and other direct costs, a statement of total cost of producing a student credit hour would necessarily include an appropriate allocation of indirect costs such as physical plant operation and administrative overhead. But since salaries constitute the largest single item of educational expenditure, and also since they are an item easily isolated in the financial accounting, the faculty salary cost per student credit hour is a useful index of the general economy of management in an instructional program.

To be of greatest usefulness, each of the foregoing kinds of data should be organized by course levels. We use three levels of courses in their analyses of instructional programs--lower-division undergraduate, upper-division undergraduate, and graduate. Lower-division courses include all those open to freshmen and sophomores. Upper-division courses are those open to juniors and seniors, but not to freshmen and sophomores. Graduate courses are those open only to students who have completed requirements for the bachelor's degree. In virtually every institution offering advanced degrees graduate students are permitted to meet a considerable part of the requirements for the master's degree through upper-division courses. It must therefore be noted that data dealing with graduate-level courses will not include all the courses that may be taken by graduate students, but only those that are supposed to be composed exclusively of graduate

students. In virtually every upper-division course in which graduate students are enrolled, they normally would be distinctly in the minority.

Departmental Comparisons

Institutional totals and averages relating to efficiency of instructional programs are useful for conveying to legislators, members of controlling boards, and officers of central institutional administration a quick picture of status and trends. Such data, however, are of little value for deans and department heads.

For internal use within a college or university the most meaningful organization of the data is by subject fields or departments. This permits each department to compare its statistics with those for other departments in the institution and with similar departments in other colleges and universities. Possible areas of inefficiency and excessive costs can thus be identified.

Arrangement of the data by subject-matter fields or departments runs into difficulty because there is no standard pattern of academic organization followed by all institutions. In some colleges, for example, English, speech, dramatics and journalism are maintained as separate departments. In other institutions these subjects are combined in a single department of English. For purposes of analysis it is necessary to make some arbitrary combinations or separations of subject-matter fields and departments in order to present data that are comparable among a group of institutions.

One other sort of data, besides those that were described in the preceding section, has been found useful in departmental analyses of instructional programs. The number of degrees of each level awarded each year in each major subject indicates the extent to which the programs of the various departments serve students who concentrate in the respective fields. Information on the number of degrees awarded each year in each subject-matter field in each institution in the United States is available in an annual publication of the U.S. Office of Education.

Inasmuch as the number of students graduating with a major concentration in a given subject may fluctuate considerably from year to year in any college or university, a suitable index of departmental production of major students may be best obtained by using the total degrees granted over a period of time, such as three years. The available data are for the total of degrees granted during an entire 12 month year, including the summer session. It should be recalled that the other data on departmental programs, used for illustrative purposes in this article, are for the regular academic year of nine months, excluding the summer session.

The number and kinds of degrees granted in a given department reflect the general purposes of its program. Some departments in a college or university may not offer opportunity for a major concentration in their subject-matter fields, but may confine their courses to those suitable for general education or for a minor concentration only. If the department does offer opportunity for a major concentration for the bachelor's or master's degree, it normally has to maintain a reasonably broad range of courses for its major students.

Question always must be raised as to whether the number of students served by the degree program in a department is sufficient to warrant the maintenance of the range of courses necessary for effective specialization. In considering the analysis of degrees granted it is important to remember that the subject-matter classification of degrees may not correspond exactly to the departmental organization, as explained in a preceding paragraph.

The general question needs to be asked as to whether the subject fields that seem to have a high cost in almost every institution actually are contributing proportionately more to the effective education of students than departments whose costs are more reasonable. And in all fields, high cost or otherwise, expansions should be scrutinized carefully. Too frequently a department will launch a degree program without regard to either cost or student demand. Perhaps the most effective means of curbing such expansionist tendencies on the part of overzealous department heads is for the dean or president to discuss with them program-analysis data of the kind discussed.

The subject-field arrangement of instructional data also is helpful for institutional administrators, board members, and legislators interested in the problem of unnecessary duplication of effort among a group of state institutions. Careful examination of such data will help answer many questions such as whether duplication is justifiable and necessary or whether it is unwise. Not all duplication is unwise or uneconomical, and the fact that a number of institutions maintain degree programs in a particular field is not prima facie evidence of uneconomical duplication.

Data such as number of degrees granted in a single year by one institution as compared with another in the same department only point to areas of possible waste of energy and resources. In general, uneconomical duplication exists when two or more institutions maintain similar programs of specialization for which student demand at one or more of the institutions has proved to be small and unsteady over a period of several years.

There are circumstances in which the continuation of a program is justified even though the student demand is small. A newly introduced program at first may serve only a limited group of students, but the number soon may increase to a point permitting economical operation.

A reasonable length of time should be allowed in which to experiment with a new program, whether graduate or undergraduate, but the institution continually should evaluate the need and strength of each program and be prepared to justify the expenditure of funds for its continuation. Sometimes a program that serves only a few students, and therefore has a high cost, is justified from the point of view of the needs of the state as a whole. Seldom, however, will such a program need to be offered in more than one institution.

Other Areas for Analysis

The kinds of analyses of instructional expenditures discussed in this article are by no means exhaustive. Nor do they represent a complete solution to the problem of determining the financial needs of instructional programs. It is particularly important to note that the technics of analysis here discussed have little relation to the quality of instructional services. The question of the quality of the services rendered students is far more important than the considerations of efficiency on which these articles have centered attention.

In general, the question of the quality of an institution's instructional program is a concern of the academic officials, rather than of those charged with responsibility only for business and financial matters. Improvement in the efficiency of the use of institutional facilities and resources is important, however, for it is one of the basic methods by which an institution can improve the quality of its services.

It should be borne in mind that we have been concerned only with the analysis of expenditures for educational and general purposes, and not even for all expenditure classifications in that category. Several major areas of institutional operation have not been treated in this series of articles, such as research, organized activities relating to instructional departments, extension services, auxiliary activities, scholarships, debt service, and capital outlay. In many of these areas the technics of analysis that have been illustrated for educational and general expenditures could well be applied.

One area omitted from discussion in this series of articles that is in great need of critical analysis is intercollegiate athletics. In many institutions throughout the country even the most elementary information about the finances of intercollegiate athletics is a closely guarded secret. Analytical treatment of data on expenditures for institutional athletic programs is virtually unknown in the published literature of higher education. The sums of money involved in this activity, however, often are large. The balance between income and expenditure is often a red figure of substantial size, made up by the application of funds that might otherwise have been available for improvement in faculty salaries.

The omission of many areas of institutional operations from the present treatment of the analysis of expenditures does not mean that such analyses would be unlikely to yield fruitful results. Like the analyses that have been suggested in other areas, the purpose would be to discover means by which the largest possible amount of institutional resources may be channeled into the programs and services that contribute most directly and effectively to the basic aims and purposes of the institution.

Virtually every institution in the country considers that it has inadequate resources to render all the services it would like to provide at a satisfactory quality level. Any administrative procedure, such as expenditure analysis, that results in the diversion of supporting resources into the most productive forms of expenditure, deserves encouragement. The mounting demands for higher education, which bid fair to increase more rapidly in the future than the supporting resources in most institutions, make more necessary than ever before a careful scrutiny and analysis of every dollar of expenditure to make sure that it is producing the maximum of educational value.

Conclusion

Higher education has come a long way in America since the first college was established more than 300 years ago. The scope of services has grown extremely complex, and the number of students served has expanded to three million or more. These expansions have brought difficult problems of financing. The growth of services in higher education has been to a considerable extent paralleled on the part of the general public by an increasing understanding and appreciation of the value of the programs carried on by colleges and universities. The willingness of the people to support higher education is shown by the 400-fold expansion in current income for educational and general purposes in the last 75 years, from approximately $5 million in 1879-80 to more than $2 billion in the most recent year for which data are available.

It has not been easy to get the funds required to support the constantly expanding program of higher education in the United States. The very lifeblood of many able leaders in the institutions of this country for many generations has been put into the efforts to get money for endowment, for buildings, and for current support from churches, alumni, philanthropic foundations, private donors, and legislative appropriating agencies of the federal, state and local governments.

The methods by which funds are obtained for the support of higher education seem to be undergoing a profound change. The day of successful fund raising, based on a forceful leader's ability to spellbind prospective donors with oratorical pleas for generous gifts for some dimly defined institutional purpose, is drawing rapidly to a close.

Today those whose purse strings have to be loosened to provide the necessary support for higher education have to be convinced of the needs by different methods.

Increasingly the appropriations committees of legislative bodies are subjecting the requests of publicly controlled institutions to careful budgetary analysis. Appropriations are determined less and less on the basis of political pressures and impassioned pleas by lobbying presidents and their friends and more and more on the basis of cold, well reasoned analyses of institutional expenditures and programs of services. Church groups, philanthropic foundations, and donors of large gifts increasingly are following the same procedure in determining the extent of their support of privately controlled colleges and universities.

The institution that expects in the future to be successful in its quest for the funds needed to support its program can be well advised first to put its own house in order. For an institution to have readily available the necessary facts and figures that indicate the efficiency of its own operations is impressive and encouraging to those who are expected to provide funds for its support. A record of improved efficiency in the use of funds is one of the best possible selling points in the contact with those from whom further support is being sought.

The colleges and universities of the United States are just now in the early years of what probably will prove to be the period of the most rapid and longest sustained expansion in all the history of higher education. Students who enter college today are staying longer than ever before; the percentage of young people who are going to college continues to increase steadily and rapidly, and the number of young people of college age in this country will increase more than 70 per cent in the next 15 years.

Unless some unforeseen catastrophe intervenes, the combination of these three factors undoubtedly will result in phenomenal increases in total college enrollments. The amount of funds that will be necessary for the support of educational services and for capital outlays to provide for the expanded enrollment will be far beyond the present level of income for higher education. Some of the necessary support unquestionably will have to come from economies and improved efficiency in the use of available institutional resources.

It is by no means too early for college and university officials to begin the practice of studying and analyzing their present expenditures to determine where and how more and better results can be obtained from the funds now available. Such results are the whole purpose of the technics and procedures for the analysis of college and university expenditures.